

Claims:

1. A reactive dye compound comprising:

- (a) at least one chromophore moiety
 (b) at least one $\text{SO}_2\text{C}_2\text{H}_4$ group which is attached to the chromophore moiety either directly via the sulphur atom of the $\text{SO}_2\text{C}_2\text{H}_4$ group or via a linking group L;

characterised in that at least one $\text{SO}_2\text{C}_2\text{H}_4$ group is substituted on its terminal carbon atom with at least one Y group wherein Y is $-\text{A}(\text{CO})\text{R}^*$ wherein A is selected from O or S and wherein R^* is an organic residue which contains at least one nucleophilic group, such as OH, NH_2 , SH, COOH, N, NHR^1 and NR^1R^2 wherein R^1 and R^2 may be the same or different and may be selected from C1-C4 alkyl; and salts thereof.

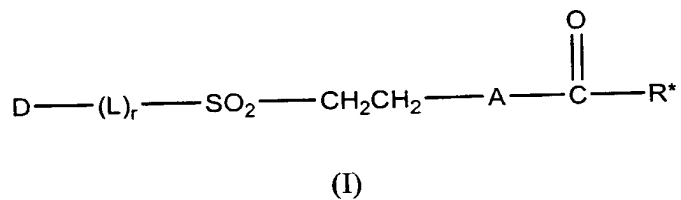
2. A reactive dye compound according to Claim 1 wherein R^* is selected from $(\text{CH}_2)_n\text{SH}$, $(\text{CH}_2)_n\text{NH}_2$, $\text{CH}(\text{CH}_3)\text{OH}$, $\text{CH}(\text{CH}_3)\text{O}(\text{CO})\text{CH}(\text{CH}_3)\text{OH}$ (i.e. a polyester of lactic acid), R^* derived from a polyester of citric acid, $\text{CH}(\text{OH})(\text{CH}_2\text{COOH})_2$, $\text{CH}_2(\text{OH})(\text{CO}_2\text{H})\text{CH}_2\text{COOH}$, $\text{C}(\text{OH})(\text{H})\text{CH}_2\text{COOH}$, $\text{CH}_2\text{C}(\text{H})(\text{OH})\text{COOH}$, $\text{C}(\text{OH})(\text{H})\text{C}(\text{OH})(\text{H})\text{COOH}$, $(\text{CH}_2)_n\text{NHR}^1$, $\text{CH}_2\text{NR}^1\text{R}^2$, CH_2NHNH_2 , CH_2NHOH , CH_2SMe , $\text{CHNH}_2(\text{CH}_2)_n(\text{COOH})$, $\text{CHNH}_2\text{CH}_2\text{SMe}$, $\text{CHNH}_2\text{CH}_2\text{SSCH}_2\text{CHNH}_2\text{COOH}$, $\text{CHNH}_2\text{CH}_2\text{SO}_3\text{H}$, $\text{C}_6\text{H}_4\text{OH}$, $\text{C}_6\text{H}_4\text{COOH}$, $\text{C}_6\text{H}_4\text{NH}_2$, $\text{C}_6\text{H}_4\text{N}$, $(\text{CH}_2)_n\text{C}_6\text{H}_4\text{N}$, $\text{CH}(\text{R}\#)\text{NH}_2$, $(\text{CH}_2)_n\text{-SSO}_3^-$, $(\text{CH}_2)_n\text{-S-S-}(\text{CH}_2)_n$, peptide of polypeptide, wherein R_1 and R_2 is independently selected from C1-C4 alkyl, wherein n is an integer in the range of 1 to 4 wherein within the same molecule n is not necessarily the same integer and wherein R# corresponds to an amino acid sidechain.

3. A reactive dye according to Claim 1 or 2 wherein R^* is selected $(\text{CH}_2)_n\text{SH}$, $(\text{CH}_2)_n\text{NH}_2$, $\text{C}_6\text{H}_4\text{N}$, $\text{CH}(\text{R}\#)\text{NH}_2$, $\text{CH}(\text{CH}_3)\text{OH}$, $\text{CH}(\text{CH}_3)\text{O}(\text{CO})\text{CH}(\text{CH}_3)\text{OH}$, $\text{C}(\text{OH})(\text{CH}_2\text{COOH})_2$, $\text{CH}_2\text{C}(\text{OH})(\text{COOH})\text{CH}_2\text{COOH}$, $\text{C}(\text{H})(\text{CH}_3)\text{OH}$, $\text{C}(\text{H})(\text{OH})\text{CH}_2\text{COOH}$, $\text{CH}_2\text{C}(\text{H})(\text{OH})\text{COOH}$, $\text{C}(\text{H})(\text{OH})\text{C}(\text{H})(\text{OH})\text{COOH}$, $\text{C}_6\text{H}_4\text{OH}$, $\text{C}_6\text{H}_4\text{NH}_2$.

4. A reactive dye compound according to any of Claims 1 to 3 wherein R^* is $\text{C}(\text{OH})(\text{CH}_2\text{COOH})_2$ or $\text{CH}_2\text{C}(\text{OH})(\text{COOH})\text{CH}_2\text{COOH}$.

10009084-110801

5. A reactive dye compound according to any of Claims 1 to 4 wherein A is O.
6. A reactive dye compound having the formula (I):

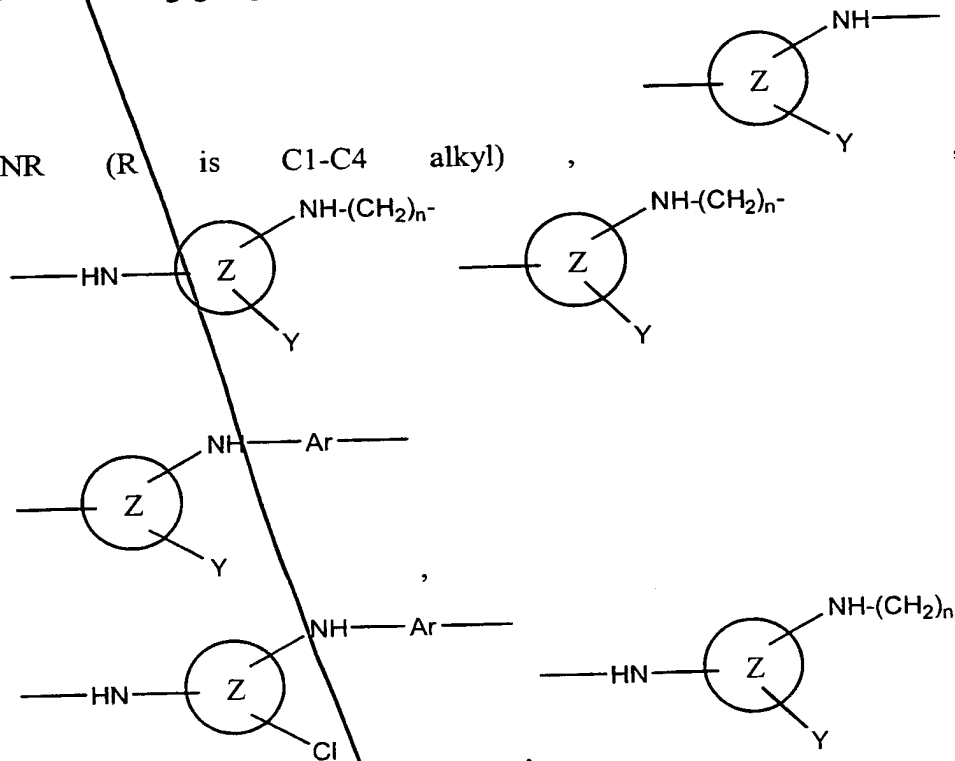


wherein: D is a chromophore group;

r is 0 or 1;

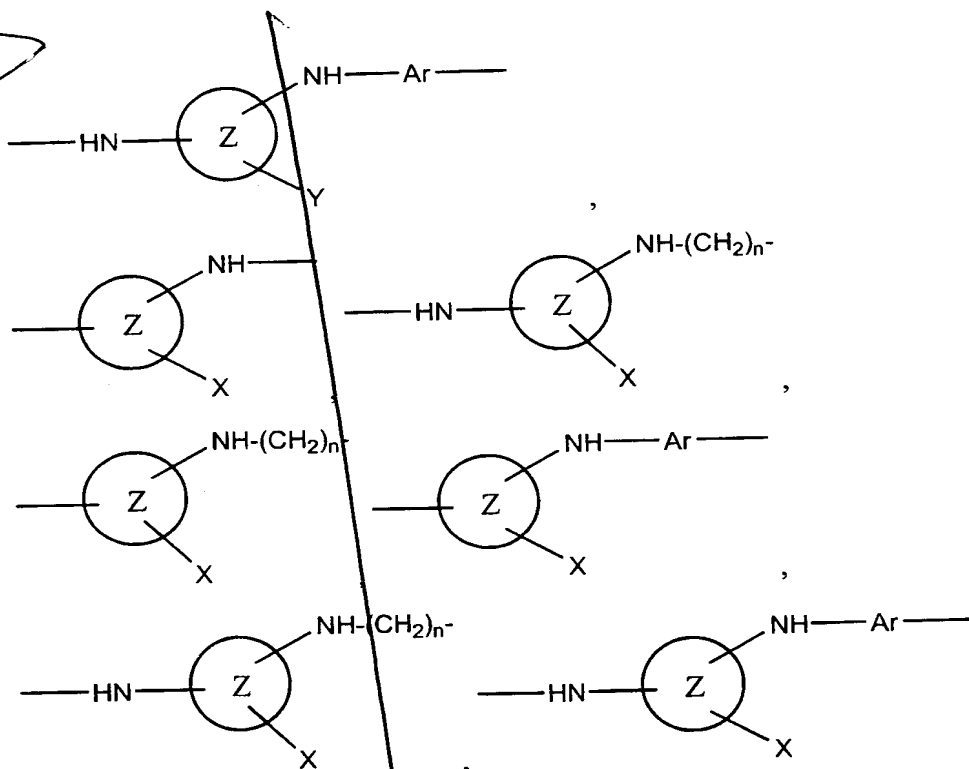
L is a linking group selected from NH, $(\text{CH}_2)_n$, $\text{N}-(\text{CH}_2)_n\text{N}$, $-(\text{CH}_2)_n\text{N}$,

NR (R is C1-C4 alkyl),



10009084 110801

Sub A1



wherein Ar is an aryl group, preferably benzene, Y is halogen or $\text{O}(\text{C}=\text{O})\text{R}^*$, n is an integer of from 1 to 4, Z is a nitrogen-containing heterocycle, X is selected from thio-derivatives, halogen (preferably fluorine and chlorine), amines, alkoxy groups, carboxylic acid groups, CN, N_3 , and quaternized nitrogen derivatives, Q^+ ;

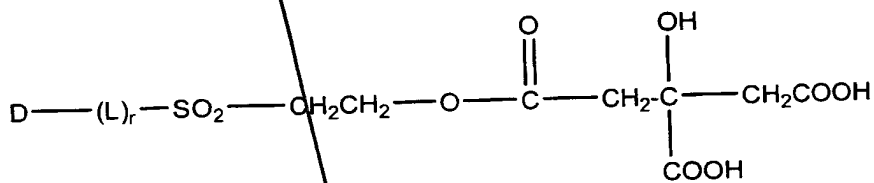
A is O or S,

R^* is selected from $(\text{CH}_2)_n\text{SH}$, $(\text{CH}_2)_n\text{NH}_2$, $\text{CH}(\text{CH}_3)\text{OH}$, $\text{CH}(\text{CH}_3)\text{O}(\text{CO})\text{CH}(\text{CH}_3)\text{OH}$ (i.e. a polyester of lactic acid), R^* derived from a polyester of citric acid, $\text{CH}(\text{OH})(\text{CH}_2\text{COOH})_2$, $\text{CH}_2(\text{OH})(\text{CO}_2\text{H})\text{CH}_2\text{COOH}$, $\text{C}(\text{OH})(\text{H})\text{CH}_2\text{COOH}$, $\text{CH}_2\text{C}(\text{H})(\text{OH})\text{COOH}$, $\text{C}(\text{OH})(\text{H})\text{C}(\text{OH})(\text{H})\text{COOH}$, $(\text{CH}_2)_n\text{NHR}^1$, $\text{CH}_2\text{NR}^1\text{R}^2$, CH_2NHNH_2 , CH_2NHOH , CH_2SMe , $\text{CHNH}_2(\text{CH}_2)_n(\text{COOH})$, $\text{CHNH}_2\text{CH}_2\text{SMe}$, $\text{CHNH}_2\text{CH}_2\text{SSCH}_2\text{CHNH}_2\text{COOH}$, $\text{CHNH}_2\text{CH}_2\text{SO}_3\text{H}$, $\text{C}_6\text{H}_4\text{OH}$, $\text{C}_6\text{H}_4\text{COOH}$, $\text{C}_6\text{H}_4\text{NH}_2$, $\text{C}_6\text{H}_4\text{N}$, $(\text{CH}_2)_n\text{C}_6\text{H}_4\text{N}$, $\text{CH}(\text{R}^\#)\text{NH}_2$, $(\text{CH}_2)_n\text{-SSO}_3^-$, $(\text{CH}_2)_n\text{-S-S-(CH}_2)_n$, R^* derived from peptide or polypeptide linked to the vinylsulphone group via its terminal carboxylic acid group, wherein R_1 and R_2 is independently selected from $\text{C}_1\text{-C}_4$ alkyl,

wherein n is an integer in the range of 1 to 4 wherein within the same molecule n is not necessarily the same integer and wherein R# corresponds to an amino acid sidechain;

and salts thereof.

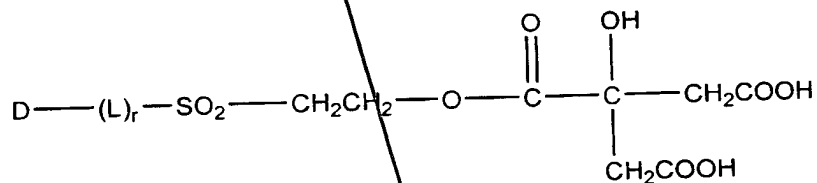
7. A reactive dye according to Claim 6 wherein R* is selected from (CH₂)_nSH, (CH₂)_nNH₂, C₆H₄N, CH(R#)NH₂, CH(CH₃)OH, CH(CH₃)O(CO)CH(CH₃)OH, C(OH)(CH₂COOH)₂, CH₂C(OH)(COOH)CH₂COOH, C(H)(CH₃)OH, C(H)(OH)CH₂COOH, CH₂C(H)(OH)COOH, C(H)(OH)C(H)(OH)COOH, C₆H₄OH, C₆H₄NH₂.
8. A reactive dye according to Claim 6 or 7 wherein R* is C(OH)(CH₂COOH)₂ or CH₂C(OH)(COOH)CH₂COOH or a derivative of a citric acid polymer.
9. A reactive dye compound according to any of Claims 6 to 8 wherein A is O.
10. A reactive dye compound having the structure:



(1a)

wherein D, L, r are as defined above.

11. A reactive dye compound having the structure:



(1b)

wherein D, L and r are as defined above.

10009084-110801

- Sub A*
12. Use of a compound according to any of Claims 1 to 11 for dyeing cellulosic substrates, preferably cotton.
 13. Use of a compound according to any of Claims 1 to 11 for dyeing wool.
 14. Use of a compound according to any of Claims 1 to 11 for dyeing polyamide substrates, preferably nylon.
 15. Use of a compound according to any of Claims 1 to 11 for dyeing silk.
 16. Use of a compound according to any of Claims 1 to 11 for dyeing keratin, preferably hair.
 17. Use of a compound according to any of Claims 1 to 11 for dyeing leather.
 18. Process for the preparation of a compound according to any of Claims 1 to 11 comprising the steps of reacting a first starting material (preferably one mole) with a second starting material (preferably one mole), the first starting material comprising at least one chromophore, at least one $\text{SO}_2\text{C}_2\text{H}_4$ which is attached to the chromophore group either directly via the sulphur atom of the $\text{SO}_2\text{C}_2\text{H}_4$ group or via a linking group L, the second starting material comprising an oxy- or thio-carbonyl group.
 19. Process according to Claim 18 wherein the process is carried out at a pH of from about 2 to about 8, preferably from about 3 to about 5.
 20. Process according to Claim 18 or 19 wherein the second starting material is added to the first starting material slowly, preferably dropwise, preferably over several hours, preferably 1-5 hours, more preferably 2-3 hours.
 21. Product obtainable by a process according to any of Claims 18 to 20.
 22. A dye composition comprising the compound or product of any of Claims 1 to 11 or 18 to 21.

10009084-110001

- Substant*
23. A dye composition according to Claim 22 wherein the composition is in the form of a solid mixture and further comprises an acid buffer.
 24. A dye composition according to Claim 22 wherein the composition is in the form of a liquid and further comprises water and an acid buffer.
 25. A dye composition according to Claim 22 wherein the composition is in the form of a paste and further comprises water, thickening agent and an acid buffer.
 26. A dye composition according to Claim 22, 23, or 25 wherein the pH is preferably from about 2 to about 3.

10009084 110801